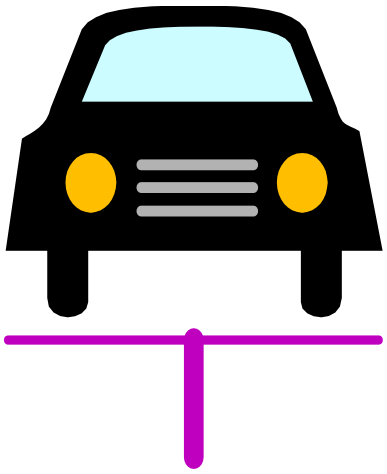
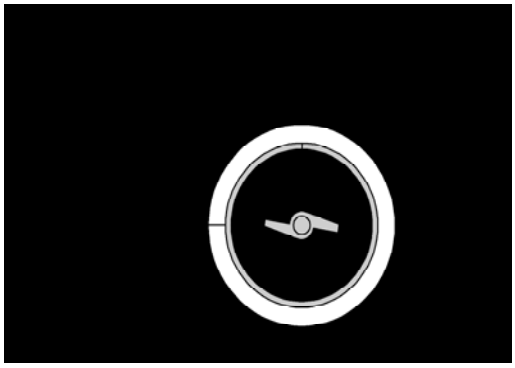
STATE OF UTAH
DEPARTMENT OF PUBLIC SAFETY

OFFICIAL SAFETY INSPECTION MANUAL
FOR
PASSENGER VEHICLES/LIGHT TRUCKS
2004





STATE OF UTAH

DEPARTMENT OF PUBLIC SAFETY

OFFICIAL VEHICLE SAFETY INSPECTION MANUAL FOR PASSENGER VEHICLES AND LIGHT DUTY TRUCKS

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Effective January 22, 2004

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Last Update February, 2004

INTRODUCTION

The Utah Highway Patrol-Vehicle Safety Inspection office has compiled this manual from many different sources. The American Association of Motor Vehicle Administrators (AAMVA), Vehicle Inspection Subcommittee of the American Automobile Manufacturers Association (AAMA), National Transportation Safety Administration (NHTSA), Utah State Criminal and Traffic Code, Federal Motor Vehicle Safety Standards (FMVSS), Commercial Vehicle Safety Alliance (CVSA) and the Code of Federal Regulations (CFR's). In addition, the Safety Inspection office is advised by the Motor Vehicle Safety Inspection Advisory Council on the adoption and implementation of Safety Inspection Standards.

This manual contains minimum standards relating to motor vehicle safety. It is expected that individual inspectors, inspection managers, fleet inspection stations and public inspection stations involved with the Safety Inspection program be familiar with this manual. Every effort has been made to provide specific inspection recommendations and procedures that will allow for the safe operation of motor vehicles on Utah's highways.

The Safety Inspection staff is committed to the safety of the motoring public. We recognize that those involved with the Safety Inspection Program are also concerned with vehicle safety. This revised manual has changes that place more responsibility on owners for repairs of non-safety critical items. Many of these changes reflect the same requirements as the commercial motor vehicle industry.

In addition to changes to the manual, Safety Inspection is reviewing its operating policies and procedures. Utah law requires the Safety Inspection office to "investigate complaints" and to protect consumers from "unwanted or unneeded repairs or adjustments", 53-8-204 UCA. To protect the integrity of the Safety Inspection program, those who violate these provisions will be dealt with both civilly and criminally.

Safety Inspection encourages all those who participate in this program to become familiar with these rules. This program is only successful with the cooperation and determination of the many stations and inspectors found throughout the state. Safety Inspection looks forward to any comments, concerns or questions that may arise in carrying out our objective of safer vehicles for Utah's highways.

This Manual supersedes all previous manuals and shall be used in determining the pass/fail condition of vehicle equipment.

VEHICLE SAFETY INSPECTION PROCEDURES

INITIATING THE INSPECTION

1) Request registration paperwork. (Vehicles may be inspected without registration paperwork.)
2) Verify vehicle identification number (VIN.)
3) Write date of inspection on inspection certificate.
4) Write owner and vehicle information on inspection certificate.
5) Vehicle mileage must be written on the certificate.
6) Inspectors must write their inspector number in the appropriate box.
7) Inspectors may not sign the certificate until the vehicle passes the vehicle inspection process.

CHECK VEHICLE INTERIOR (Can be done from parking area to inspection stall)

1) Check for impaired visibility through windshield.
2) Check for adequate visibility from required mirrors.
3) Check seatbelts for proper operation.
4) Check for looseness in steering.
5) Check for play in brake pedal.
6) Check emergency brake for proper operation.
7) Check horn. Must be audible at 200 feet.
8) Check windshield wiper/washer operations.
9) Check heater/defroster operation.

CHECK VEHICLE EXTERIOR

1) Check if both high and low headlights are operative.
2) Check headlights for proper aim.
3) Check parking lights, taillights, signal lights, marker lights and reflux reflectors.
4) Check for the proper color of lights.
5) Check tires.
6) Check body, fenders, door and hood latches, and bumpers
7) Check for broken glass.
8) Check for window tinting. The yes or no box must be checked on the certificate. Window tint measurements must be recorded on the certificate when aftermarket tint is present.

CHECK UNDER HOOD

1) Check belts.
2) Check hoses.
3) Check power steering pump.
4) Check wiring.
5) Check exhaust manifold.
6) Check master cylinder.
7) Check for fuel leaks.

CHECK SUSPENSION AND UNDERCARRIAGE

1) Check wheel bearings.
2) Check ball joints.
3) Check tie rod ends.
4) Check idler arms.
5) Check shock absorbers.
6) Check springs (coil & leaf.)
7) Check exhaust system.
8) Check floor pans.
9) Check fuel system lines.

CHECK WHEELS AND BRAKES

1) Check for loose or missing lug nuts.
2) Check for cracked wheels.
3) Check pads and/or shoes.
4) Check rotors and/or drums.
5) Brake measurements must be recorded on the inspection certificate.
6) Check for fluid leaks.
7) Check brake hoses.

NOTE: Vehicles that fail a plate brake test, but have adequate pad and or shoe thickness, must still be rejected until repairs are made.

LIFTED OR LOWERED VEHICLES

Lifted Vehicles:

1) Check that fenders cover full width of tire.
2) Check for mudflaps. (Must cover full width and top 50% of tire.)
3) Check frame height. (Based on Gross Vehicle Weight Rating, GVWR)
4) Check for body lift.
5) Check for stacked blocks.
6) Check for modification of brake hoses.
7) Check headlight aim and vertical height. (Maximum headlight height is 54" to center of the bulb.)

Lowered Vehicles

1) Check that fenders cover full width of tire.
2) Check for mudflaps, when required. (Must cover full width of tire.)
3) Check for minimum ground clearance.
4) Check for removal of original suspension components.

REJECT VEHICLE PROCEDURES

1) When a rejectable item is found a full vehicle inspection must still be completed.
2) If a vehicle fails an inspection and no repairs are made, give the owner the reject certificate.
3) Do not sign the inspection certificate if a reject certificate is issued.
4) If a customers returns within 15 days, no additional charge may be made to verify repairs.
5) On rejected vehicles that fail to return, the State Tax and Owner copies must be returned to the Safety Inspection office within 45 days of the inspection date.
6) Any item rejected and repaired during an inspection must be documented as repaired on the certificate.
7) Reject repairs may be verified by any certified inspector at the inspection facility.
8) When all rejected items have been repaired, the verifying inspector must sign the safety inspection certificate.
9) If the verifying inspector is not the original inspector, he/she must sign the safety inspection certificate, and enter their inspector license number on the safety inspection certificate.

PASSED VEHICLE PROCEDURES

1. The inspector performing the inspection must sign the vehicle inspection certificate. Inspectors using the Vehicle Inspection Report, VIR, in connection with the emission testing process, must sign the VIR in the location reserved for the inspector's signature.
2. The customer must receive the State Tax and Owner copies of the inspection certificate.
3. **Maximum** Safety Inspection fees are as follows:

$ 9.00	Motorcycles.
$17.00	Passenger vehicles and trucks (26,000 lbs GVWR or less.)
$22.00	4 wheel drive and other vehicles that require the disassembly of a front hub or removal of a rear axle for inspection.
$17.00	Trucks, buses and trailers over 26,000 lbs GVWR.

Refer to the Vehicle Safety Inspection Manual Section for specific details regarding the inspection process.

INSPECTION REPORT PROCEDURE

1. Report forms are to be completed as follows:

    a. Date the inspection was completed.
    b. Owner's name.
    c. Year and make of the vehicle.
    d. Vehicle identification number.
    e. Appropriate notation in any of the fifteen repair columns.
    f. Total cost of the repair including the inspection fee.
    g. Certificate or sticker number.

2. Certificate or sticker numbers must be listed in numerical order starting with the lowest number and listed in groups of 25. ie: 1-25, 26-50, etc.
3. A separate report form must be used for the certificates for the stickers.
4. Duplicate certificates or stickers must be noted as "duplicate" on the report form.
5. Lost or stolen certificates or stickers must be listed as "lost or stolen" on the report form.
6. Certificates and stickers rendered unusable through some mishap must be recorded as “voided” on the report form and certificates/stickers must be returned to the Vehicle Safety Inspection office.
7. Rejected vehicles which have not returned within 15 days to the original station, must be listed in the same order and the words “rejected” printed on the same line.
8. Failure to submit the required reports will be considered grounds for suspension or revocation of a license.

Note: Counties utilizing I/M machines may print their report form from the I/M machine. These reports must be numbered in groups of 25. The print allows the selection of the beginning and ending certificate number. The Safety Inspection office will return any reports not grouped numerically in multiples of 25.

Returning of Reject Certificates:

On rejected vehicles that fail to return for re-inspection, the State Tax and Owner copies must be returned to the Safety Inspection office within 45 days of the original inspection date.

BUILDING AND EQUIPMENT REQUIREMENTS

The following conditions must be met before a license will be granted:

1. The building must be of permanent construction, 12 feet wide or wider, and 25 feet long or longer. The building must be capable of housing the vehicle being inspected. If a headlight-aiming screen is used, a level surface 25 feet from the screen must be available for headlight aiming purposes. (See Headlight Aiming Screen Diagram P-11)

2. The station must have the following:
   a. A level concrete or asphalt floor.
   b. The necessary hand tools to conduct an inspection.
   c. A hoist or heavy duty jacks and jack stands to allow for the inspection of the undercarriage and the front steering and suspension components.
   d. Measuring gauges and instruments for determining minimum specifications in the inspection process.
   e. A two-piece light meter kit capable of measuring window light transmittance at a minimum of ± 2%.
   f. A **current safety inspection manual**.

3. Any exceptions to the minimum building and equipment requirements must be submitted in writing to the Vehicle Safety Inspection office for approval.

4. The building requirements of this section may be waived in the case of a mobile station, if in the opinion of the department the mobile station is capable of conducting safety inspections.

5. A $1000.00 Surety Bond is required while the station is in business as an official safety inspection station.

REQUIRED EQUIPMENT LIST

Passenger, Light Truck Requirements:

a) Headlight Aiming Device (machine, optical, or screen)
b) Hoist / and or Heavy Duty Jack / Jack Stands
c) Light Meter (2 piece approved by division)*
d) Hand Tools (wrenches, screwdrivers, ratchets, etc.)
e) Dial Indicator (for measuring ball joint and suspension component tolerances)
f) Tire Tread Depth Gauge
g) Current Safety Inspection Manual

BRAKE GAUGES,

a) Bonded
b) Riveted
c) Disc
d) Rotor
e) Drum

Tools can be purchased from any company that manufactures these types of tools.

NOTE: Riveted brake lining gauge can be used for tire tread depth gauge or visa versa. Bonded / Rotor gauge can be interchangeable (micrometer can be used).

***Department approved light meters can be ordered from the following:**

<> ADVANCED DESIGN SYSTEMS 1-800-865-1820
<> NEW WORLD INSTRUMENTS 1-800-997-2662
<> LASER LABS 1-800-452-2344

SUPPLIES ORDER FORM

UTAH HIGHWAY PATROL
SAFETY INSPECTION

ORDER FORM

INSPECTION SUPPLIES

STATION NUMBER_____

_____
NAME

_____
ADDRESS

_____ / /
CITY STATE ZIP

PASSENGER VEHICLES
$100.00 per book of 50 certificates

Inspection Certificates (Quanity)_____

Certificate Report Forms (No Charge)_____

COMMERCIAL VEHICLE STICKERS
$50.00 per book of 25 stickers

Window & Trailer
stickers 26,000 lbs. +_____

Affidavits (No Charge)
Report Forms (No Charge)

SAFETY INSPECTION MANUAL $_____

TOTAL$_____

INSPECTION REPORTS ARE DUE WITH THIS ORDER

Mail to

UTAH HIGHWAY PATROL
VEHICLE SAFETY INSPECTION
5681 SOUTH 320 WEST
MURRAY, UTAH 84107

REGIONAL EDUCATIONAL INSTITUTIONS

BEAR RIVER REGION #5596
Bridgerland Applied Technology Center
Mike Nield, Dept. Head/Instructor
1301 North 600 West
Logan, Utah 84321
Phone for Students (435) 753-6780
FAX (435) 750-3058

OGDEN-WEBER REGION #5597
Weber Sate University
Maurine Fryer, Coordinator
Roger Crockett, Administrator
4010 University Circle
Ogden, Utah 84408-4010
Challenge Testing ONLY (801) 626-6802 / 03
Continuing Education Classes (801) 626-6600
FAX (801) 626-7917

DAVIS – MORGAN REGION #5598
Davis ATC
Walt Novak
550 East 300 South
Kaysville, Utah 84037-2699
Phone for Students (801)593-2549
FAX (801) 776 –5818

WASATCH FRONT SO. REGION #5599
Salt Lake Community College / Miller Campus
Anita Oleksy, Program Operations Specialist
9750 South 300 West, Room 3-211
Sandy, Utah 84070
Phone for Students (801) 957-4154
FAX (801) 957-7531

MOUNTAINLANDS REGION #5600
Utah Valley State College (UVSC)
Mountainland Applied Technology Center
800 West University Parkway
Orem, Utah 84058
Phone for Students (801) 863-6282
FAX (801) 764-7531

CENTRAL REGION #5601
Sevier Valley ATC
Jerry Hawley, Coordinator
200 South 800 West
Richfield, Utah 84701
Phone for Students (435) 896-9752
FAX (435) 896-9763

SOUTH EAST REGION #5602
College of Eastern Utah
Jordan Hatch
451 East 400 North
Price, Utah 84501
Phone for Students (435) 637-2201
FAX (435) 637-2201

SOUTH WEST REGION #5603
Southern Utah University
Danny Shakespear, Coordinator
351 West Center Street
Cedar City, Utah 84720
Phone for students (435) 652-7741
FAX (435) 865-7873

SOUTH WEST REGION #5604
Dixie College
Kelli Stephens, Coordinator
225 South 700 East
St. George, Utah 84770
Phone for Students (435) 652-7741
FAX (435) 865-7873

UINTAH BASIN REGION #5605
Uintah Basin ATC
Garth Sorenson, Coordinator 124-5
1100 East Lagoon Street
Roosevelt, Utah 84066
Phone for Students (435) 722-4523
FAX (435) 722-5804

WASATCH FRONT WEST REGION
Salt Lake / Tooele ATC (SLTATC)
West Valley Training Center
2255 South 5370 West
West Valley City, Utah 84120
Charles Majofsky (Skee)
Phone (801) 493-8700
Fax (801) 493-8750

SECTION 1 - REGISTRATION

The first step in the inspection of a vehicle is a review of the registration papers. Vehicles with out-of-state registration or vehicles with no registration can be inspected. These requirements apply to passenger cars, light trucks, motorcycles, heavy trucks, trailers, and buses.

A. AGREEMENT AMONG PAPERS

Check vehicle registration certificate, identification number on vehicle, license plates and vehicle description for agreement. Record the manufacturers VIN Plate Number on the safety inspection certificate.

ADVISE vehicle when:

Paperwork disagreements are accidental and clerical in nature.

REJECT vehicle when:

Registration certificate, identification number, license plate and vehicle description are not in agreement.

NOTE: Verification of VIN is required on all inspections.

B. PLATE MOUNTING

If the vehicle is registered, inspect the license plates to see that they are securely mounted and are clearly visible.

ADVISE vehicle when:

Plates are not securely fastened, obscured or cannot be clearly identified.

(Utah Law requires two plates on most vehicles. Vehicles with Utah apportioned plates are only issued one plate.)

ADVISE vehicle when:

Plates have tinted or colored covers. License plates must be visible from 100 feet. (41-1a-403 UCA and 41-1a-404 UCA)

SECTION 2 - TIRES AND WHEELS

Tires are a critical safety item and shall be inspected as follows:

A. TIRE DAMAGE

1) Tires must be checked for tread cuts, snags, or sidewall cracks.

REJECT vehicle when:

Tires have cuts, plugs in the sidewall, snags or sidewall cracks deep enough to expose cords.

2) Check tires for bumps, bulges, knots or cords showing through weather cracks.

REJECT vehicle when:

a) Tires have visible bumps, bulges or knots indicating partial failure or separation of the tire structure.
b) Cords are showing through weather cracks.

ADVISE vehicle when:

Tire has weather cracks, but no cords are showing.

B. REGROOVED OR RECUT TIRES

Check for specially constructed tires that have under tread rubber for the purpose of regrooving or recutting.

REJECT vehicle when:

Tires are regrooved and are not identifiable as regroovable.

C. RESTRICTED MARKINGS

Tires must be checked for "restricted usage only" markings.

REJECT vehicle when:

Tires are marked "for farm use only", "off-highway use only", "for racing only" or other non-highway use.

TIRES AND WHEELS - Continued

D. MISMATCHING

1. Check tires for the same size and same type construction. All tires on the same axle must be of the same size and construction (bias or belted).

   REJECT vehicle when:

   Tires on the same axle are not the same size and construction. This includes more than 1" difference in tire size width.

2. Check tires for proper width. (See also Section 5-Altered Vehicles)

   REJECT vehicle when:

   Does not have the complete width of the upper 50% of the tire covered by original fenders, by rubber, or other flexible fender extenders.

E. TIRE WEAR

Check tires with tread wear bars.
Check tires without tread wear indicators.
See: **Figure P-1**

ADVISE vehicle when:

Tread wear bars are touching the road surface.

REJECT vehicle when:

Tread grooves are less than 2/32 across a total of 2 or more adjacent tread grooves for a distance of 10 inches on the tread circumference.

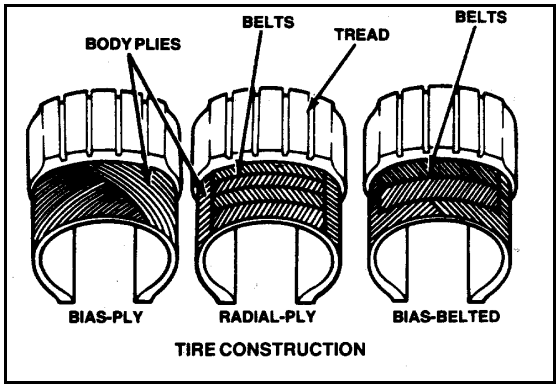


Figure P-1

TIRES AND WHEELS - Continued

F. WHEELS

1. Check wheels for any damage and proper mounting.

   REJECT vehicle when:

   a) Has 25% or more of the wheel bolts, nuts, studs or lugs loose, missing or damaged per wheel.
   b) Wheels are bent, cracked, re-welded or have elongated bolt holes.
   c) Spacers are used to increase the wheel track width.

   NOTE: Custom wheel adapters are not spacers. Also, 'BEAD LOCKS' on Rims are illegal and will be a reject.

G. TIRE SIZE, TIRE WIDTH, FENDERS AND MUDFLAPS

1. Check vehicle tires for proper size and weight load ratings.

   Check that fenders and mud flaps are in place when required. *

   REJECT vehicle when:

   a) Tires do not meet proper load rating per axle as determined by OEM specifications.
   b) Tires are mounted on wheels that are not within tire manufacturers specifications.
   c) Tire tread is not fully covered by existing fenders or fender extenders.
   d) Rear tires do not have the top 50% of the tire covered by mud flaps*.
   e) Rear mud flaps are not as wide as the tire.*

*Mud flaps are required on any vehicle modified from original OEM specifications. This includes larger tires or any alterations to the frame or suspension. 41-6-150.10 UCA.

H. STUDDED SNOW TIRES

41-6-150 UCA states that studded snow tires are legal from October 15 through March 31 of each year.

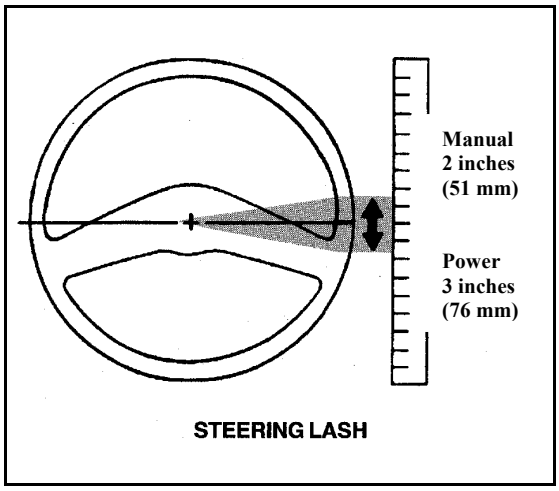
ADVISE vehicle when:

Tires have studded snow tires between April 1 and October 14 of any year.

SECTION 3 - STEERING

The steering system must be inspected to determine if excessive wear and/or maladjustment of the linkage and/or steering gear exist. Vehicle must be on a smooth, dry, level surface. On vehicles equipped with power steering, the engine must be running and the fluid level, belt tension and condition must be adequate before testing.

A. LASH OR FREE PLAY



Measure lash at steering wheel.

REJECT vehicle when:

Steering wheel movement exceeds:
Manual - 2 inches (51 mm)
Power - 3 inches (76 mm)
Rack and pinion - 0.4 inch (10 mm)

(See Figure P-2)

Figure P-2

B. SIZE

Check size of steering wheel.

REJECT vehicle when:

Steering wheel is less than 13 inches in outside diameter or is not of full circular construction. (SAE Recommended Practice SAE J287)

C. TRAVEL

Turn steering wheel through a full right and left turn and check for binding, or jamming conditions.

REJECT vehicle when:

a) Steering is incapable of being turned fully from right to left steering stops.
b) Has one wheel, which turns before the opposite wheel.

STEERING - Continued

D. POWER STEERING

1. Check condition and tension of steering belts.

   ADVISE vehicle when:

   Steering belts are cracked or not properly adjusted.

   REJECT vehicle when:

   Belts are frayed, and the serpentine belt is torn.

2. Check for rubbing and condition of steering system, hoses, hose connections, cylinders, and valves.

   REJECT vehicle when:

   a) Hoses or hose connections are leaking.
   b) Leaking from cylinder valves.

3. Check the condition of pump. Check for secure mounting and proper fluid level in reservoir.

   REJECT vehicle when:

   a) Pump mounting parts are loose or broken.
   b) When system is inoperative.
   c) Reservoirs are leaking or fluid level is below the manufacturers minimum specification.

E. STEERING COLUMN

1. Check for separation of shear capsule from bracket and general "looseness" of wheel and column.

   REJECT vehicle when:

   Shear capsule is separated from bracket, and/or wheel and column can be moved as a unit.

E. STEERING COLUMN (Continued)

2. Check movement on "tilt" steering wheels.

REJECT vehicle when:

a) Adjustable steering wheel cannot be secured in all positions.
b) Steering column has 3/4 inch or more movement at the center of the steering column when locked in position.

F. IDLER ARMS AND TIE RODS

Check the idler arms and tie rods for looseness in excess of OEM specifications.

REJECT vehicle when:

a) Has looseness in the tie rod ends in excess of OEM specifications.
b) Tie rod grease seals are cut, torn or otherwise damaged to the extent that they will not retain lubricant.

G. RACK AND PINION

A thorough inspection of the complete system is needed.

Support vehicle by the frame. Check for looseness in the outer tie rod ends by pushing up and down with hand pressure. Push and pull on the tire when checking the inner tie rod.

REJECT vehicle when:

a) Has any looseness in excess of OEM specifications.
b) Has any looseness in the tie rod ends in excess of OEM specifications.

H. GEARBOX

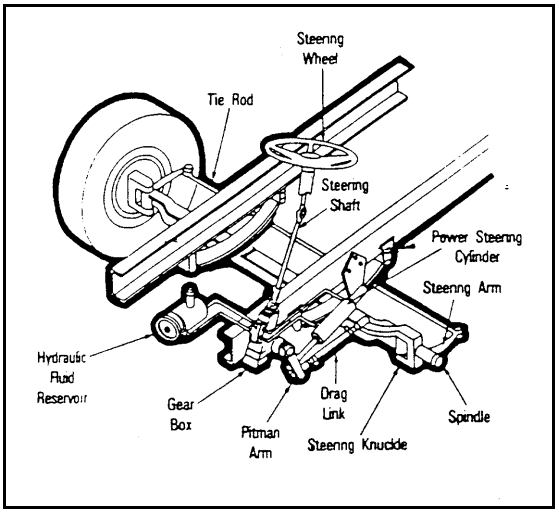
Check steering gear box for proper functioning.

REJECT vehicle when:

a) Gearbox has looseness at frame or mounting.
b) Gearbox has cracks.
c) Gearbox mounting brackets are cracked.
d) Gearbox fasteners are missing.

STEERING - Continued

I. PITMAN ARM



Check pitman arm.

REJECT vehicle when:

Gearbox output shaft has movement inside pitman arm.

J. WHEEL BEARINGS

Check all wheel bearings for looseness.

With the front end of the vehicle lifted, grasp the top and bottom of the tire, rock tire in and out to determine looseness.

REJECT vehicle when:

Has bearing movement of more than 1/8 inch (measured at outer circumference of tire.)

K. COTTER PINS

Check steering components and axle nuts for required cotter pins.

REJECT vehicle when:

Cotter pins are missing or loose.

SECTION 4 - SUSPENSION

Inspection of ball joints on models prior to 1973 must be conducted with the joints unloaded. After 1973 some manufacturers provide wear indicating ball joints that allow for a visual inspection while the joints loaded. If there are any questions on a vehicles proper inspection, verify the specifications with Original Equipment Manufacture (OEM). In checking for motion of ball joints, keep in mind that the load carrying joints must be UNLOADED, and a pry bar pressure sufficient only to lift the weight of the wheel assembly is applied. If the inspector uses the "leverage" of a pry bar to exert excessive pressure, he can easily "force" an apparent ball joint movement and get a false reading.

Sagging springs, broken torsion bars, worn or deteriorated bushings, loose or missing U-bolts can cause vehicle handling instability and brake pull.

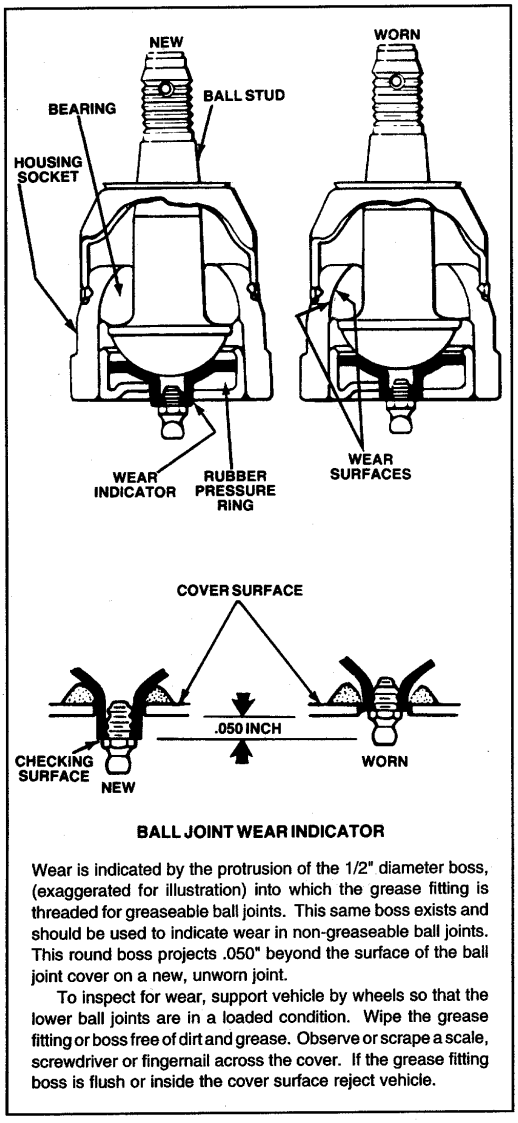
A. VEHICLES WITH WEAR INDICATING BALL JOINTS

Support vehicle with ball joints loaded and wheels straight ahead. Wipe grease fitting and check that surface is free of dirt and grease. Determine if checking surface extends beyond the surface of the ball joint cover.

REJECT vehicle when:

a) Ball joint wear indicator is flush or inside the cover surface. (See fig. P-4)
b) Ball joint seals are cut, torn or otherwise damaged to the extent that they will not retain lubricant.

NOTE: Wear is indicated by the protrusion of the 1/2" diameter boss, (exaggerated for illustration) into which the grease fitting is threaded. This round boss projects .050" beyond the surface of the ball joint cover on a new, unworn joint. Before replacing ball joints or tie rod ends consult the manufacturer's specifications.



BALL JOINT WEAR INDICATOR

Wear is indicated by the protrusion of the 1/2" diameter boss, (exaggerated for illustration) into which the grease fitting is threaded for greaseable ball joints. This same boss exists and should be used to indicate wear in non-greaseable ball joints. This round boss projects .050" beyond the surface of the ball joint cover on a new, unworn joint.

To inspect for wear, support vehicle by wheels so that the lower ball joints are in a loaded condition. Wipe the grease fitting or boss free of dirt and grease. Observe or scrape a scale, screwdriver or fingernail across the cover. If the grease fitting boss is flush or inside the cover surface reject vehicle.

BALL JOINT WEAR INDICATOR

Figure P-4

B. VEHICLES WITHOUT WEAR INDICATING BALL JOINTS

1. Unload the ball joints by raising the vehicle, depending on the construction of the suspension system. (See fig. P-5)

   REJECT vehicle when:

   Ball joint movement is in excess of manufacturers specifications.

2. Check the ball joint seals.

   REJECT vehicle when:

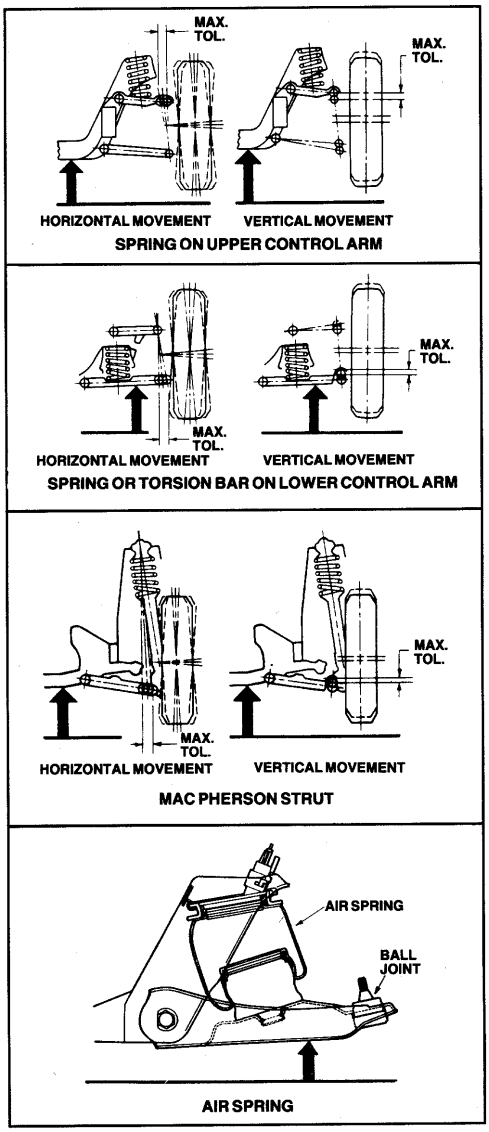
   Ball joint seals are cut, torn or otherwise damaged to the extent that they will not retain lubricant.

C. VERTICAL MOVEMENT

Position a pry bar under the front tire and with a lifting motion sufficient to overcome the weight of the wheel assembly only, move wheel up and down.

REJECT vehicle when:

Ball joint movement is in excess of OEM specifications. (See fig. P-5)



RAISING POSITIONS FOR SUSPENSION SYSTEMS

Figure P-5

SUSPENSION - Continued

D. HORIZONTAL MOVEMENT

Grasp the tire and wheel assembly at the top and bottom. Move in and out to detect looseness. (More horizontal movement is allowable because of the nature of most ball joint construction.)

REJECT vehicle when:

Movement is in excess of manufacturers specifications. (See fig. P-5)

NOTE: Some manufacturers do not accept horizontal movement as being indicative of ball joint wear.

E. SPRINGS

1. Visually inspect for broken or damaged leaf springs.

   REJECT vehicle when:

   a) Springs are cracked, broken, disconnected, or cut.
   b) Springs are sagging and allow the body to come in contact with the tires.

2. Check the spring shackles.

   REJECT vehicle when:

   Shackles are broken or shackles have been modified and do not meet or exceed OEM specifications.

3. Check the U- bolts.

   REJECT vehicle when:

   U bolts are broken or if there are not at least 3 threads showing beyond the nut.

4. Check the coil springs.

   REJECT vehicle when:

   a) Springs are broken or not properly attached.
   b) Springs have been heated, cut or otherwise altered from OEM Specifications.

SUSPENSION - Continued

F. TORSION AND SWAY BARS

Visually inspect for damage.

REJECT vehicle when:

Torsion bars or sway bars are cracked, bent or disconnected.

G. CONTROL ARMS

1. Look for cracks, bends, or breakage.

   REJECT vehicle when:

   Control upper or lower arms do not meet *OEM specifications i.e., bent, cracked, welded, etc.

2. Check bushings for wear or distortion.

   REJECT vehicle when:

   Bushings are missing, worn or distorted so that looseness is present.

   NOTE: Sagging springs, broken torsion bars, worn or deteriorated bushings, loose or missing U-bolts can cause vehicle handling instability and brake pull.

H. MCPHERSON STRUTS (See page 26 Figure P-5)

Check the spring mounted strut assembly. The strut must be inspected very closely for leakage, shaft binding and poor damping. Moisture or dampness around strut assembly is not cause for rejection.

ADVISE vehicle when:

Struts have poor damping, shaft binding, or leakage.

REJECT vehicle when:

a) Has any wear in the upper mount assembly.
b) Has any horizontal or vertical movement in the lower shaft mounting area.

SUSPENSION - Continued

I. SHOCK ABSORBERS

Visually inspect shock absorbers for looseness of mounting brackets and bolts.

ADVISE vehicle when:

Continues free rocking motion after release or shock absorbers are leaking.

REJECT vehicle when:

a) Shock absorbers are missing or disconnected.
b) Mounting brackets, bolts, or bushings are loose, broken or missing.

J. CV AXLE

Check CV axle and axle boots.

ADVISE vehicle when:

CV boots are cracked or torn.

REJECT vehicle when:

CV joint makes popping or clicking noise while turning during test drive.

K. U-JOINT

Check u-joints for wear.

ADVISE vehicle when:

Wear is found in u-joint.

SECTION 5 - ALTERED VEHICLES

A. LOWERING VEHICLE

All replacement parts and equipment shall be equal to or greater in strength and durability than the OEM parts. (Utah Lift Law Title 41-6-148.32 UCA)

REJECT vehicle when:

a) Chassis or suspension components are less than three inches above the ground, excluding tires, rims or mudflaps.
b) Body or chassis contacts the roadway.
c) Fuel tank is exposed to damage without a skid plate.
d) Wheels or tires make contact with the body.
e) Tire tread is not fully covered by existing fenders or fender extenders.
f) Braking, steering or suspension is modified disconnected or changed in any manner that may impair the safe operation of the vehicle.
g) Main springs or shocks have been removed to accommodate a hydraulic or air suspension system.

B. RECONSTRUCTED MOTOR VEHICLES

Check the suspension lift.

REJECT vehicle when:

Lift components and suspension systems are not made and installed in accordance with applicable provisions for the particular chassis from the original manufacturer.

ALTERED VEHICLES - Continued

C. RAISING VEHICLES

1. Check the braking and steering system components.

   REJECT vehicle when:

   Braking or steering systems have been altered, modified, disconnected or changed in any manner that may impair the safe operation of the vehicle.

2. Check vehicle lift. (Utah Lift Law Title 41-6-148.32 UCA)

   REJECT vehicle when:

   a) Frame height is greater than 24 inches on a vehicle with a GVWR less than 4, 500 lbs.
   b) Frame height is greater than 26 inches on a vehicle with a GVWR of 4,500 lbs. and less than 7,500 lbs.
   c) Frame height is greater than 28 inches on a vehicle with a GVWR of 7,500 lbs. or more.

NOTE: ***Vehicle must be on a flat surface and unladen for all measurements. Frame height measurement is from the ground to the bottom of the frame and should be taken on the left side of the vehicle under the drivers seat. If the door certification plate has been removed, the vehicle shall be considered to be 4,500 lbs.***

3. Check the body lift above the frame. (Title 41-6-148.32 UCA)

   REJECT vehicle when:

   Lowest part of body floor is raised more than 3" above top of frame.

4. Check vehicle for front and rear axle blocks. (Title 41-6-148.31 UCA)

   REJECT vehicle when:

   a) Axle blocks have been added to the front axle.
   b) There are stacked blocks on the rear axle. (The stacking of axle blocks is prohibited.)
   c) There are stacked frames.

C. RAISING VEHICLES (Continued)

5. Check vehicle wheel track. (Title 41-6-148.32 UCA)

REJECT vehicle when:

a) Tire tread protrudes beyond the original fender or fender extenders.

NOTE: Fender flares or fender extenders are required to cover both front and rear tires when wheel track extends beyond the vehicle body.

b) Spacers are used to increase wheel track width.

NOTE: Custom wheel adapters are not spacers.

6. Check for mud flaps. Mud flaps are required on the rear wheels of all vehicles that are altered from their original OEM specifications. This includes the addition of larger tires and suspension lift kits. (Title 41-6-150.10 UCA)

REJECT vehicle when:

a) Fenders do not cover the top 50% of the tire
b) Mud flaps are not present when required.
c) Rear mud flaps are not as wide as the tire.

NOTE: Mud flaps would not be required if the original fenders cover the top 50% of the tire.
From the rear, mud flaps must hang down to the center of the axle.

SECTION 6 - BRAKES

PROCEDURE FOR PLATE BRAKE TESTERS

Station owner/operators are not required to use a computerized brake testing device as a mandatory piece of inspection equipment; however, when used in the Safety Inspection Program stations/inspectors are required to:

1. Follow equipment manufacturer procedures for testing.

2. Be certified by the equipment manufacturer and/or an authorized agent of the Utah Highway Patrol Safety Inspection Section. Inspector certifications must be renewed every three years.

3. Display, in a prominent location, their inspector certification card for the equipment being used.

4. Display, in a prominent location, the computerized brake testing equipment certification. The manufacturer must certify equipment yearly.

5. Pull two wheels upon the failure of the brake plate test to check brake components. Vehicles that have adequate pad and or shoe thickness must still be rejected until repairs are made.

6. Do a visual two wheel inspection of brake components when requested by a customer.

7. Display the following sign in a conspicuous location. The sign must be 14" X 24." Lettering will be one inch in vertical height and no less than one quarter of an inch in width and display the following statement:

Station #1,
Station Name

Uses a computerized plate brake tester to inspect the braking system efficiency of the vehicle presented for an inspection. This test does not measure lining thickness or condition of the drum / rotor.

However, at the customers request we will pull two wheels for a visual check, per State of Utah Safety Inspection requirements.

BRAKES - Continued

When a visual inspection is performed, it is required, that at least one front and one rear wheel be removed for a brake inspection on all vehicles less than 10,000 lbs. GVWR. Always inspect brake drum linings, pads, discs, calipers and the condition of all mechanical components.

Vehicles over 10,000 lbs. GVWR are not required to have wheels pulled **if** the vehicle is equipped with inspection plates (adjustment slots are not inspection plates) or if the vehicle has open brake drums.

NOTE: Brake hoses must be DOT approved and cannot be altered.

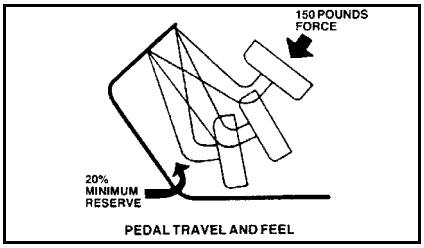
A. HYDRAULIC SYSTEM

1. Test pedal reserve. (See fig. P-7)

   REJECT vehicle when:

   Has less than 1/5 (20%) of the total available pedal travel when the brakes are fully applied. Exceptions for 1987, 88 and 89 Oldsmobile Toronados, early Ford normally aspirated diesels on some 70's, 80's, 90's models. **Revised October 1, 1997**

Figure P-7



2. Check the wheel cylinders for leakage.

   REJECT vehicle when:

   Wheel cylinders leak. **DO NOT DISTURB DUST BOOT**

3. Inspect hydraulic hoses and tubes for exposed fabric cord, flattened, restricted or unsecured lines.

   REJECT vehicle when:

   Hoses or tubing leak, are cracked, show exposed fabric cord, flattened, restricted or are unsecured.

BRAKES - Continued

A. HYDRAULIC SYSTEM (Continued)

Inspect master cylinder for leakage and fluid level.

REJECT vehicle when:

a) Master cylinder leaks, or fails to operate properly.
b) The fluid level is more than 3/4 inch below the top of the reservoir or below the add line if present.
c) Master cylinder gasket is damaged.

B. DUAL HYDRAULIC CIRCUITS

Check vehicles equipped with a brake warning light. Test for operation of light.

REJECT vehicle when:

a) Warning light comes on when brake pedal is depressed.
b) Warning light does not operate when required. (Turn key to on position to check.)

C. HYDRAULIC SYSTEM WITH VACUUM ASSIST

1. Check the condition of vacuum system for collapsed, broken, badly chafed and improperly supported tubes and loose or broken hose clamps.

REJECT vehicle when:

a) Hoses, tubes, or booster are leaking.
b) System is collapsed, broken or badly chafed and showing metal or fabric cord.
c) System is improperly supported or loose because of broken clamps.
d) Hoses or tubes are exposed to damage from excessive heat, debris or rubbing.

2. Determine if system is operating.

First, turn off engine. Second, depress brake pedal several times to deplete all vacuum in the system. Third, while maintaining pedal force, start engine and observe if pedal falls slightly when engine starts.

REJECT vehicle when:

Service brake pedal does not fall slightly as engine is started and while pressure is maintained on pedal.

D. HYDRAULIC BOOSTER SYSTEM WITH VACUUM ASSIST

1. Check the integrated Hydraulic Booster

> **With the ignition key in the off position, depress brake pedal a minimum of 25 times (50 times on jeeps with anti-lock brakes) to deplete all residual stored pressure in the accumulator. Depress pedal with a light foot-force (25 lbs.). Place the ignition key in the on position and allow 60 seconds for the brake warning lights to go out indicating the electric pump has fully charged the accumulator.**

REJECT vehicle when:

a) Brake pedal does not move down slightly as the pump builds pressure.
b) The brake warning lights remain on longer than 60 seconds.

2. Check the braking system, while fully charged, for leaks and proper fluid levels.

REJECT vehicle when:

a) Fluid reservoir is below the add line or more than ¾ inch below the top of the reservoir.
b) Has broken, kinked or restricted fluid lines or hoses.
c) Has any leakage of fluid at the pump or brake booster, or any of the lines or hoses in the system.

E. BRAKE DRUMS

1. Check the condition of the drum friction surface for substantial cracks, damage and contamination. (Short hairline heat cracks should not be considered).

REJECT vehicle when:

Has substantial cracks on the friction surface extending to the open edge of the drum.

2. Check for cracks on the outside of drum.

REJECT vehicle when:

Brake drums have external cracks.

NOTE: Short hairline cracks should not be considered.

BRAKES - Continued

E. BRAKE DRUMS - Continued

3. Check for mechanical damage.

   REJECT vehicle when:

   There is evidence of mechanical damage other than wear.

4. Check for leaks at all grease or oil seals.

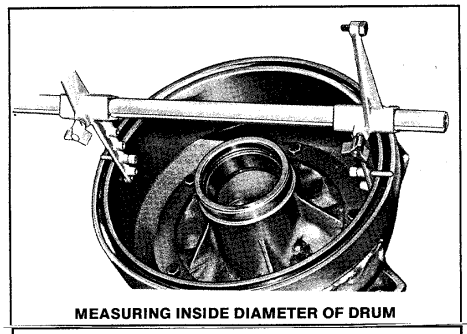
   REJECT vehicle when:

   Leakage of oil, grease or brake fluid contaminates brake components.

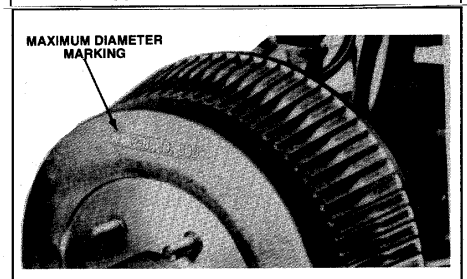
5. Check drum diameter.

   REJECT vehicle when:

   Drum is turned or worn beyond manufacturers specifications.



MEASURING INSIDE DIAMETER OF DRUM



DRUM DIAMETER MARKING

Figure. P-8

F. BRAKE ROTORS

1. Check the condition of the rotor friction surface for substantial cracks. (Short hairline heat cracks should not be considered.)

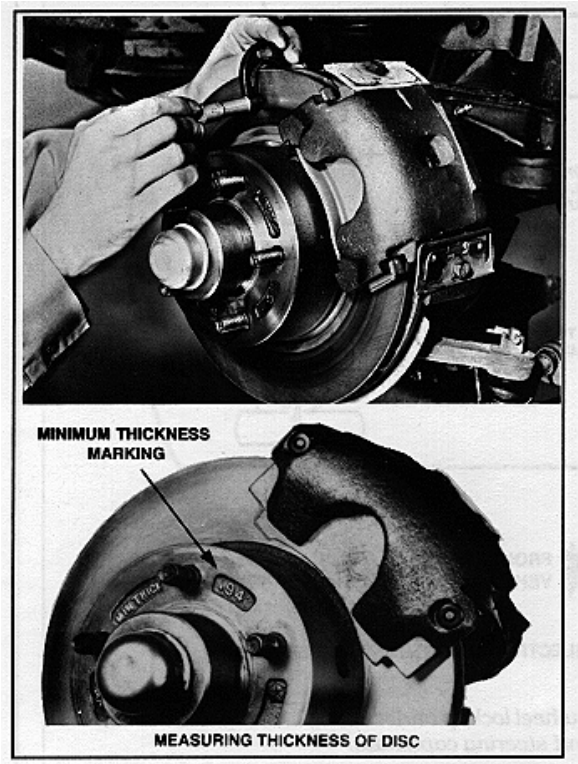
   REJECT vehicle when:

   a) There are substantial cracks on the friction surface extending to open edge of rotor.
   b) Friction surface is contaminated with oil or grease.

2. Check rotor thickness.

   REJECT vehicle when:

   Rotor thickness is less than manufacturer's specifications.



MEASURING THICKNESS OF DISC

Figure P-9

G. BONDED LINING & PADS

Check the primary and secondary lining thickness at the thinnest point.

ADVISE vehicle when:

Lining thickness is worn to 2/32 inch.

REJECT vehicle when:

Lining thickness is worn to less than 2/32 inch.

H. RIVETED LINING & PADS

1. Check for loose or missing rivets.

   REJECT vehicle when:

   Rivets are loose or missing.

2. Check the primary and secondary lining thickness above rivet head by measuring at the thinnest point.

   ADVISE vehicle when:

   Lining thickness is worn to 2/32 inch above any rivet head.

   REJECT vehicle when:

   Lining thickness is less than 2/32 inch above any rivet head.

   NOTE: Calipers must be removed to accurately measure riveted pads.

I. ALL LININGS

1. Check for broken or cracked linings.

   REJECT vehicle when:

   Linings are broken, cracked or not firmly and completely attached to shoe.

I. ALL LININGS (Continued)

2. Check for contamination of friction surface.

REJECT vehicle when:

Friction surface is contaminated with oil, grease or brake fluid.

3. Check for uneven lining wear.

ADVISE vehicle when:

Lining is uneven or grooved.

J. MECHANICAL BRAKE COMPONENTS

1. Check for missing or defective mechanical components.

REJECT vehicle when:

Mechanical parts are missing, broken or badly worn.

2. Check for frozen calipers, rusted or inoperative connections, missing spring clip and defective grease retainers.

REJECT vehicle when:

Mechanical parts are frozen, inoperative, missing or defective.

3. Check for restriction of shoe movement at backing plate and for binding between brake shoe and anchor pins. (See page 41, Figure P-10)

REJECT vehicle when:

Shoes and anchor pins are improperly positioned or misaligned.

K. PARKING BRAKE

1. Check holding ability.

   REJECT vehicle when:

   Parking brake fails to hold vehicle in parked position.

2. Check ratchet or the locking device.

   REJECT vehicle when:

   Ratchet, pawl or other locking device fails to hold brake in an applied position.

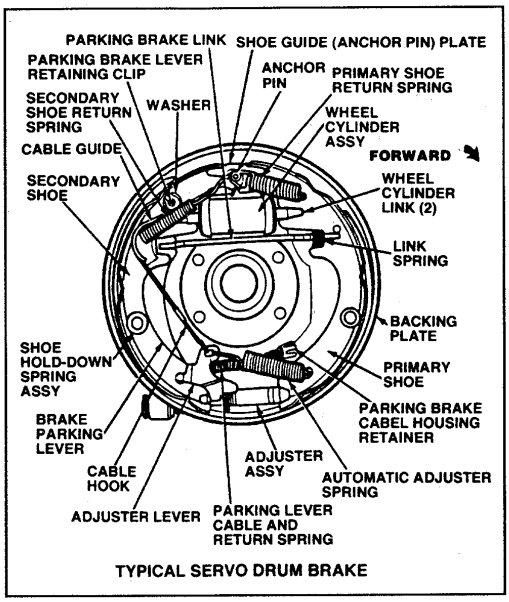
L. ANTI-LOCK BRAKES (ABS SYSTEM)

Check ABS warning light and system for proper operation.

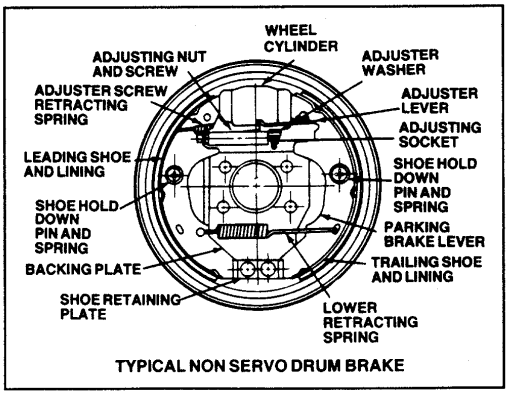
ADVISE vehicle when:

a) ABS light fails to light, fails to shut off after 60 seconds or when 5 rapid beeps are heard when ignition switch is turned to the on position.
b) ABS components are broken, missing or disconnected.

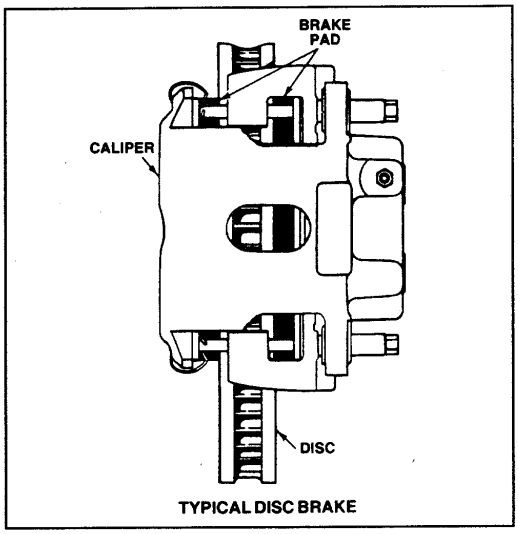
Figure P-10



TYPICAL SERVO DRUM BRAKE



TYPICAL NON SERVO DRUM BRAKE



TYPICAL DISC BRAKE

SECTION 7 - LIGHTING

Lights must conform to manufacturer's specifications, Federal Motor Vehicle Safety Standards (FMVSS) and Utah State Laws.

Lenses that are patched, taped or covered with a temporary substance and lenses that have been equipped with any tinted covers **MUST BE REJECTED**.

However, in 1996 the use of a clear cover for headlamps was approved for marketing in Utah, see **NOTE** in headlamps. Xenon bulbs, commonly known as the 9004 series, are USDOT approved.

A. HEADLAMPS

1. Check headlamp for proper mounting.

   REJECT vehicle when:

   Mounting brackets are loose, missing or damaged in any way so headlamp cannot be properly and securely mounted.

2. Check headlamp for proper aim.

   REJECT vehicle when:

   Headlamps are not aimed to specifications.

3. Check headlamps for proper lighting.

   REJECT vehicle when:

   Headlamps fail to light properly.

A. HEADLAMPS (continued)

4. Check headlamps for holes and non-factory colored covers or non-transparent covers.

ADVISE vehicle when:

Headlamp has holes in headlight lens. (May be sealed with silicone).

REJECT vehicle when:

Headlamp coverings, not authorized by the department, are placed on or in front of any headlamp.

NOTE: Impact Headlight Savers Inc. manufactures a clear laminate product that can be attached to a headlight to cover holes or cracks and to help keep the headlight from breakage. The cover does not discolor with age and meets FMVSS standards. The cover is acceptable as a permanent repair and will pass inspection.

B. HEADLAMPS - HIGH AND LOW BEAMS

Check dimmer switch for proper functioning.

REJECT vehicle when:

Dimmer switch fails to work properly.

C. BACKUP LIGHTS/LICENSE PLATE LIGHT

Check the backup lights for proper functioning.

ADVISE vehicle when:

Backup lights or rear license plate lights fail to light.

REJECT vehicle when:

Backup lights remain lighted when transmission is not in reverse.

D. HAZARD WARNING LAMPS

Check hazard-warning lamps for proper functioning.

REJECT vehicle when:

Hazard warning lamps fail to function properly.

E. INTERIOR INDICATOR LAMPS

Check interior lamps for proper functioning.

REJECT vehicle when:

Turn signal indicators, high beam indicator, brake warning indicator or parking brake indicator fail to function.

F. PARKING LAMPS

Check parking lamps for proper functioning.

ADVISE vehicle when:

Parking lamps fail to function properly as originally designed.

G. SIDE MARKER LAMPS (SIDE REFLEX REFLECTORS)

Check side marker lamps for proper functioning and color

ADVISE vehicle when:

Side marker lamps are not functioning properly.

REJECT vehicle when:

Side marker lamps are the incorrect color. (Side marker lamps must be yellow or amber on the front and red on the rear. FMVSS 108)

H. AUXILIARY LIGHTING

Check auxiliary lamps for proper mounting and aiming. Auxiliary lights must be USDOT approved, mounted between 15" to 56" in height, have a separate switch to operate, and may ONLY be white, yellow or amber in color.

REJECT vehicle when:

a) Auxiliary lamps are improperly mounted, aimed and/or fail to direct light properly. (Auxiliary lights may not be aimed higher than the low beam headlight).
b) Auxiliary lamps are other than white, yellow or amber.
c) Auxiliary lamps are not USDOT approved.

I. TAIL LAMP ASSEMBLY

1. Check tail lamp assembly for proper lenses and required reflex reflectors.

REJECT vehicle when:

Rear lenses do not produce red light or are covered by non-approved type lens covers.

NOTE: A recent NHTSA interpretation indicates that aftermarket taillight covers create a non-compliance issue with FMVSS 108 (S5.1.3). Also, Utah Code 41-6-141 states that lighting devices may not be used if they "tend to change the original design or performance" of the original device.

2. Check lens covers for breakage.

REJECT vehicle when:

Tail lamp lenses are broken to the extent that any white light shows through broken area.

3. Check for the proper operation.

REJECT vehicle when:

Tail lamps fail to light properly.

I. TAIL LAMP ASSEMBLY (Continued)

4. Check for proper mounting.

   REJECT vehicle when:

   Lamps are not securely mounted.

5. Check for visibility.

   REJECT vehicle when:

   Lamps are not visible from a distance of 500 feet in normal light.

J. STOP LAMPS

1. Check stop lamps for proper color.

   REJECT vehicle when:

   Stop lamp lenses are not red in color. (**Blue dots in taillights are illegal**).

2. Check the stop lamps for breakage.

   REJECT vehicle when:

   Stop lamp lenses are broken to the extent that white light is visible to the rear.

3. Check for the correct operation of stop lamps.

   REJECT vehicle when:

   Stop lamps fail to light properly.

4. Check for proper stop lamp mounting.

   REJECT vehicle when:

   Stop lamps are not securely mounted.

J. STOP LAMPS (Continued)

5. Check the visibility of stop lamps.

   REJECT vehicle when:

   Stop lamps are not visible from a distance of 500 feet in normal light.

6. Check center high mounted stop lamp. (Required on all passenger cars after September 1985 and pickup trucks after September 1993). 49 CFR 571.108

   REJECT vehicle when:

   a) Center high mounted stop lamp does not light
   b) If any after market tint has been applied over the center high mounted stop lamp.

K. TURN SIGNAL OPERATION

1. Check the turn signals on all vehicles manufactured in 1956 and later.

   REJECT vehicle when:

   Is not equipped with proper signals.

2. Check switch for proper functioning.

   ADVISE vehicle when:

   Switch does not cancel automatically for 1956 and later vehicles.

3. Check switch for proper functioning.

   REJECT vehicle when:

   Turn signal lever needs to be held in the on position.

3. Check for broken lenses.

   REJECT vehicle when:

   Turn signal lenses are broken or missing.

K. TURN SIGNAL OPERATION-Continued

4. Check for proper color of lenses.

   REJECT vehicle when:

   Turn signal colors are not red, yellow or amber in the rear or white or amber in the front.

5. Check for visibility of lenses.

   REJECT vehicle when:

   Turn signals are not visible from a distance of 100 feet in normal light.

   NOTE: Lamps must be located at the same level and as widely spaced laterally as is practical.

LIGHTING - Continued

L. LIGHTING-GENERAL REQUIREMENTS ON ALL VEHICLES

Equipment required at the tine the vehicle was manufactured to meet FMVSS 108.

NOTE: No light colors other than those described on the chart are allowed. Neon lights are not acceptable. Xenon headlight bulbs are acceptable.

LIGHT	LOCATION	HEIGHT	COLOR	NUMBER
Headlamp (not required on trailer)	Front	22"- 54"	White	2 or 4
Taillamp	Rear	15" - 72"	Red	2 or more
Turn Signal Lamp	Front (not less than 4" from low-beam headlamp-SAE J 588e)	15" - 83"	Amber	2 or more
(not required on truck-tractor if front turn signals are double-faced and visible from the rear)	Rear	15" - 83"	Red or Amber	2 or more
Hazard Lamp (same lamp as turn signal)	Front	15" - 83"	Amber	2 or more
	Rear	15" - 83"	Red or Amber	2 or more
Stop Lamp	Rear	15" - 72"	Red	2 or more
License Plate Lamp	Rear, at license plate	----	White	1 or more
Side Marker Lamp (not required on truck-tractor)	Side near front Side near rear	15" minimum 15" minimum	Amber Red	1 each side 1 each side
Backup Lamp (not required on trailer)	Rear	----	White	1 or more
Rear Reflector	Rear	15" - 60"	Red	2 or more
Side Reflector (not required on truck-tractor)	Side near front Side near rear	15" - 60" 15" - 60"	Amber Red	1 each side 1 each side
Intermediate Side Lamp (if vehicle overall length is 30' or greater)	Side near center	15" minimum	Amber	1 each side
Intermediate Side Reflector (if vehicle overall length is 30' or greater)	Side near center	15" - 60"	Amber	1 each side
Parking Lamp (only if vehicle is less than 80" wide)	Front (not required on trailer)	15" - 72"	Amber or White	2 or more

M. LIGHTING GENERAL (Continued)

In addition to the above chart, the following lights are required on all vehicles 80" wide or wider.

LIGHT	LOCATION	HEIGHT	COLOR	NUMBER
Identification Lamp	Front, spaced 6"-12" on center (not required on trailer)	As high as practical	Amber	3
	Rear (not required on truck-tractor)	As high as practical	Red	3
Clearance Lamp	Front, at widest point	As high as practical	Amber	2
	Rear, at widest point (not required on truck-tractor)	As high as practical	Red	2

L. HEADLAMP AIMING REFERENCE

1. Headlamps-High and Low Beams

Vehicle must be tested on a level surface. **Always adjust lights to a setting of 0-0 when using a mechanical aimer.**

Check headlamps by attaching mechanical aimer to lamps and take readings. (Limits are in inches.)

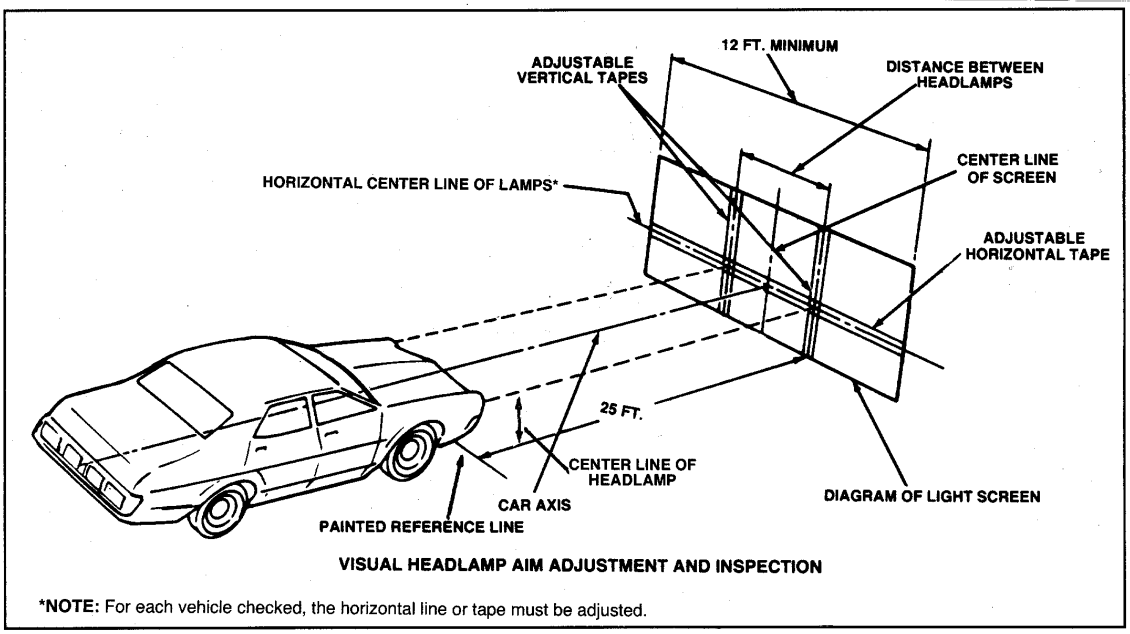
REJECT vehicle when:

a) Horizontal aim is more than: - 4 inches to the LEFT or
- 4 inches to the RIGHT

b) Vertical aim is: - higher than 4 inches UP or
- lower than 4 inches DOWN

NOTE: A mechanical aimer should be used according to the manufacturer's instructions and must be calibrated to the slope of the floor on which the vehicle stands. Headlamp aiming by the screen method requires a level area in a darkened location, sufficient for the vehicle and an additional 25 feet from lamps to screen.

The vehicle **MUST** be located accurately in front of the screen. (Limits are in inches at 25 feet.)



VISUAL HEADLAMP AIM ADJUSTMENT AND INSPECTION

*NOTE: For each vehicle checked, the horizontal line or tape must be adjusted.

M. HEADLAMP AIMING REFERENCE-Continued

2. HEADLAMP- AIMING SCREEN

With the vehicle properly located and loaded, switch headlamps to high beam and observe center of high intensity zone on screen.

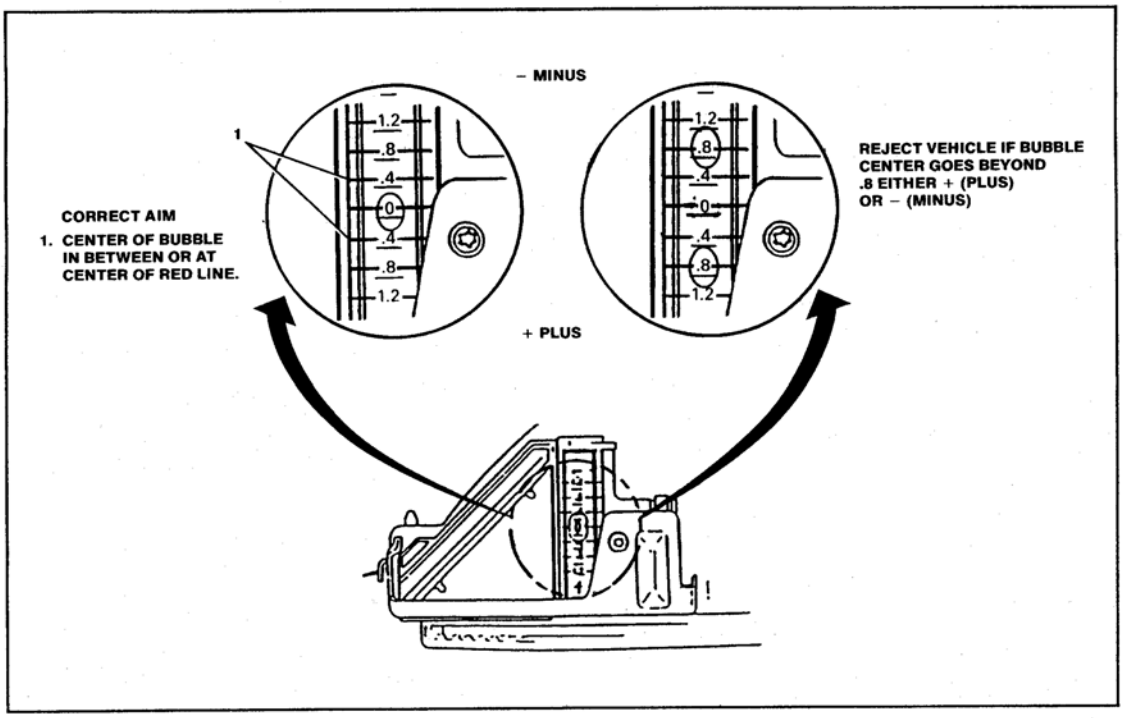
REJECT vehicle when:

a) Center is: - More than 4 inches **RIGHT** or
- More than 4 inches **LEFT** of straight ahead.

b) Vertically - - More than 4 inches **ABOVE** or
- More than 4 inches **BELOW** the horizontal line.

3. HEADLAMP AIMING-ON-BOARD DEVICE

On vehicles equipped with V.H.A.D., aiming and aim checks may be performed on the vehicle if the vehicle is placed on a level surface. Preparation of the vehicle is similar to other aiming methods as far as loading and physical condition of vehicle.



VHAD VERTICAL AIM

SECTION 8 - ELECTRICAL SYSTEM

A. ELECTRICAL ITEMS

1. Check the horn.

   REJECT vehicle when:

   a) Horn is not securely fastened.
   b) Horn does not function properly (must be audible under normal conditions at a distance of not less than 200 feet).

2. Check the electrical switches.

   ADVISE vehicle when:

   Electrical switches fail to function as designed for OEM required equipment.

3. Check the electrical wiring.

   REJECT vehicle when:

   Wiring insulation is worn or rubbed bare.

4. Check electrical connections.

   ADVISE vehicle when:

   a) Connections show signs of corrosion.
   b) Permanent connection wires are not soldered and/or insulated.

5. Automatic Transmission Only. Check neutral starting switch to determine that the starter operates only with the gear selector in "P" and "N".

   REJECT vehicle when:

   Starter operates in any gear other than "P" and "N".

SECTION 9 - VEHICLE WINDOWS

Automotive Safety Glazing is marked with the manufacturer's trademark and the letters "AS" followed by a number 1 to 14. 1966 and later models also have model and D.O.T. numbers. Windshields must be marked AS1, AS10 or AS14. **A WINDSHIELD IS REQUIRED IN <u>ALL</u> VEHICLES, EXCEPT MOTORCYCLES.**
(See Figure P-14)

GLAZING POSITION MARKINGS FOR PASSENGER CARS

(This chart excerpted from ANSI Standard Z26.1 Table A1)		Glazing Material Applicable When Marked With "AS" Designation Indicated Below	
		At Levels Requisite for Driving Visibility	At Levels Not Requisite for Driving Visibility*
PASSENGER CARS	Windshields	1,10	1*,10*
	Interior Partitions, Auxiliary Wind Deflectors	1,2,4,10,11	1,2,3,4,5,10,11
	Flexible Curtains, Readily Removable Windows, Ventilators Used in Conjunction with Readily Removable Windows, Rear Windows in Tops of Convertible Cars	1,2,4,6,10,11	1,2,3,4,5,6,7,10,11
	Openings in Roofs Not Required for Driving Visibility	———	1,2,3,4,5,10,11
	All Other Glazing Except as Listed Above	1,2,10,11	1,2,3,10,11
TAXICABS	Windshields	1,10	1*,10*
	Interior Partitions, Auxiliary Wind Deflectors, Windows in Rear Doors	1,2,4,10,11	1,2,3,4,5,10,11
	Openings in Roofs Not Required for Driving Visibility	———	1,2,3,4,5,10,11
	Flexible Curtains, Readily Removable Windows, Ventilators Used in Conjunction with Readily Removable Windows	1,2,4,6,10,11	1,2,3,4,5,6,7,10,11
	All Other Glazing Except as Listed Above	1,2,10,11	1,2,3,10,11

**Glazing material which is intentionally made so that only a portion of a single sheet has a luminous transmittance of not less than 70 percent will be marked at the edge of the sheet to show limits of the area that may be used at levels requisite for driving visibility. The marks A ↓ S1 or A ↑ S2 etc. will be used with the arrow pointing to the portion of the sheet having a luminous transmittance of not less than 70 percent, and the number indicating the item with which that portion of the sheet complies.*

Figure P-14

Cracks may be repaired up to 24 inches in length, or several cracks that measure up to 24 inches, anyplace in the windshield other than in the acute area (see acute area diagram.)
NOTE: Architectural glass and plexiglass is prohibited.

A. WINDSHIELD

1. Check windshield for appropriate AS number.

   REJECT vehicle when:

   Windshield does not have AS1, AS10, or AS14 marking.

2. Visually inspect windshield for scratches, etching, or other marks.

   REJECT vehicle when:

   a) Windshield glass is scratched, discolored, clouded or marked to the point vision is obstructed.
   b) Windshield has decorative etching that is not OEM.

3. Check windshield for breakage.

   REJECT vehicle when:

   a) Windshield has outright breakage; glass shattered either on the inside or outside surface and/or broken glass leaving sharp or jagged edges.
   b) Windshield has any crack or cracks that have a cumulative total of more than 24 inches in any area of the windshield.
   c) Windshield damage is in the acute area and is larger than 1/4 " in diameter. (See definition of acute area in Figure P-15).
   d) Windshield cracks run the full length of the windshield either horizontally or vertically.
   e) Windshield cloudiness is more than 1 inch in from each side edge, more than 4 inches down from the top edge, or more than 3 inches up from the bottom edge.

VEHICLE WINDOWS – Continued

A. **WINDSHIELD (Continued)**

4. Check for unauthorized tinting, signs, posters or other non-transparent materials.

REJECT vehicle when:

Windshield allows less than 70% light transmittance and signs, posters, or any other non-transparent materials are **MORE THAN** 4 inches down from the top edge of windshield or **below the AS 1 ↓ line**, whichever is lower.

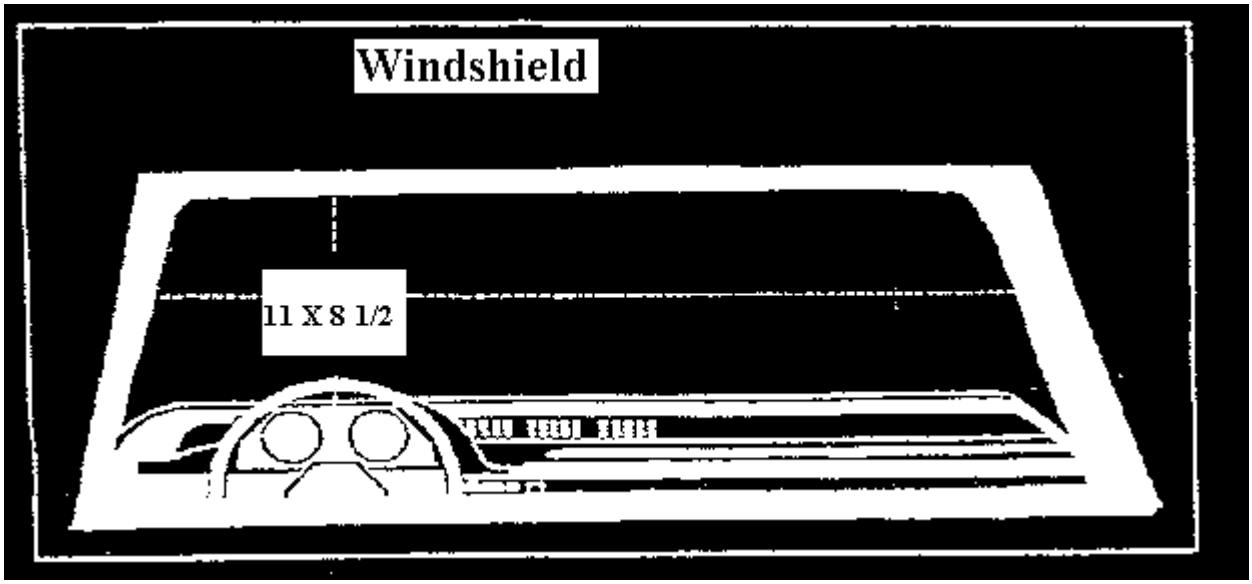


Figure P-15

The acute area on the windshield is measured by bisecting the windshield horizontally, with an intersecting line drawn through the middle of the steering column. An area of 11" in width and 8 ½" in height (sheet of paper) is then measured at the cross section. If there is any damage within this area, larger than 1/4", the windshield must be rejected and the windshield must be replaced.

B. WINDSHIELD DEFROSTER

Turn on windshield defroster fan switch and inspect for heated air blowing over the inside of the windshield.

REJECT vehicle when:

Defroster fan fails to function or fan functions but a stream of air cannot be "felt" blowing against the proper area of the windshield. (Engine must be warm and all elements of the defroster system must be on).

NOTE: Vehicles manufactured after January 1, 1969 must be equipped with a windshield defroster system.

C. WINDSHIELD WIPERS

1. Check for satisfactory operation. (If vacuum operated, engine must be idling.)

   REJECT vehicle when:

   Wipers fail to function properly (Two or more speed system is required after January 1968). When vehicle was originally equipped with two windshield wipers, both must function properly.

2. Check wiper blades for damaged, torn or rubber hardened elements.

   REJECT vehicle when:

   Wiper blades show signs of physical breakdown of rubber wiping element.

3. Check for damaged metal parts of wiper blades or arms.

   REJECT vehicle when:

   Wiper blades or arms are missing and/or are damaged.

4. Check for proper contact of blades with windshield.

   REJECT vehicle when:

   Wiper blade arms stop in drivers view or the blade fails to contact the windshield firmly.

   NOTE: Rear window wipers are optional and do not need to work.

D. WINDSHIELD WASHERS

Check for proper operation of hand or foot control and an effective amount of fluid delivered to the windshield

ADVISE vehicle when:

System is not capable of cleaning an effective wash area.

REJECT vehicle when:

System fails to function.

NOTE: System must function at any temperature.

E. LEFT/RIGHT FRONT WINDOWS-ALL VEHICLES

1. Check operation of window at drivers left side and right side.

   ADVISE vehicle when:

   Left front window cannot be readily opened to permit arm signals, even though vehicle is equipped with mechanical turn signals.

2. Check the windows to the left and right of driver for tinting or shading, scratches, discoloration and/or cloudiness.

   ADVISE vehicle when:

   Side windows are scratched, discolored and /or clouded but the driver's view of the side mirrors is not obstructed.

   REJECT vehicle when:

   a) Has any tinting, or non-transparent material added to the window to the immediate left or right of the drivers' seat that allows less than 43% light transmittance. (Front left/right windows).
   b) Front left and right side windows are scratched, discolored and/or clouded or etched with other than OEM markings to the point where the drivers' view of the side mirrors is obstructed.
   c) Right side mirror is missing when any window is tinted.

E. LEFT/RIGHT FRONT WINDOWS-ALL VEHICLES (Continued)

3. Check the windows to the left and right of the driver for breakage.

   REJECT vehicle when:

   Glass is broken, shattered or jagged.

4. Check the wind deflector's (bubbles) when present on some vehicles.

   REJECT vehicle when:

   Wind deflector is tinted to allow less than 43% light transmittance, or when deflector and window are both tinted to allow less than 43% light transmittance.
   (This applies only to wind deflectors on the front left and right windows of the driver, which block visibility to the left and/or right mirror or both.)

F. WINDOWS BEHIND DRIVER – ALL VEHICLES

1. Check windows behind the driver for tinting or for material that presents a metallic or mirrored appearance.

   REJECT vehicle when:

   Windows are covered by or treated with a material, which presents a metallic or mirrored appearance when viewed from the outside of the vehicle.

2. All windows behind the driver do not have window tint limits. If window tint is on the rear window the center high mounted brake light **CANNOT** be covered.

   REJECT vehicle when:

   a) Glass is broken, shattered or jagged.
   b) Windows that are replaced by wood, cardboard or plastic.
   c) Center high mounted brake light is covered with window tint or is not visible.
   d) Has tint that shows a metallic or mirrored appearance.

F. WINDOWS BEHIND DRIVER – ALL VEHICLES (Continued)

3. Check for left and right outside rearview mirror.

REJECT vehicle when:

Is missing a left or right outside rearview mirror. (All vehicles with window tint must have a left and right side mirror. Right side mirrors are an option on passenger vehicles that do not have any tint. Right side mirrors are required on all trucks and MPV's)

SECTION 10 - BODY

A. PROTRUDING METAL

Check for torn metal parts, moldings, etc. which may protrude from vehicle.

REJECT vehicle when:

Has torn metal, glass or other loose or partially dislocated parts protruding from the surface of the vehicle.

B. BUMPERS

Check bumpers to make sure that they meet OEM Specifications in vertical height, centered on the vehicle's centerline, connected securely to the vehicle frame, and extend the entire width of the vehicle wheel track.

REJECT vehicle when:

a) Bumpers are not 4.5 inches in vertical height.
b) Bumpers do not extend to the entire width of original body wheel track.
c) Bumpers are missing, improperly attached, broken, or have portions protruding which create a hazard.
d) Bumpers are not made from a material that is strong enough to effectively transfer impact.

NOTE: Pickup trucks are designed and manufactured for a rear bumper, OEM (Original Equipment Manufacture). These types of vehicles can be sold and may be purchased without a rear bumper, however, this does not release the vehicle owner of responsibility for compliance with Utah State Law in the safe operation of that vehicle on Utah roads. (41-6-148.33 UCA)

NOTE: Roll pans are not bumpers. Roll pans are only acceptable when a material concealed behind the roll pans meets the strength, vertical height and securement requirements of a bumper.

C. FENDERS

Check for removal or alteration of front or rear fenders.

REJECT vehicle when:

Any fender has been removed, or altered to such extent that it does not cover the entire width and upper 50% of the tire.

D. SEATS AND SEAT BELTS

1. Check seats for proper operation of adjusting mechanism and to see that the seats are securely anchored to the floor.

   REJECT vehicle when:

   a) Seats are not anchored to the floorboard.
   b) Seat adjusting mechanism slips out of set position.
   c) Seat adjusting mechanism does not function properly.
   d) Seat back is broken or disconnected from base so that it will not support a person's full weight.
   e) Seat belts are not installed or are inoperative. (Seat belts are required in all vehicles manufactured after July 1, 1966.)

2. Check the motorized safety belts.

   Enter the vehicle and close the door, insert the key into the ignition and turn to the on position. A motor causes the shoulder belt to slide along a track starting at the front body "A" pillar and moving rearward to its locked position at the "B" pillar. The shoulder belt warning indicator lamp should illuminate from four to eight seconds. When the ignition is turned to the off position and the door is opened, the shoulder belt moves forward to the "A pillar."

   ADVISE vehicle when:

   Motorized seat belts do not operate properly.

   REJECT vehicle when:

   Motorized seat belts do not lock in the rear position.

E. AIR BAGS

1. Check the Air Bag Readiness Light:

   Turn the key to the on position. The light will indicate normal system operation by lighting for 6-8 seconds then turning off.

   ADVISE vehicle when:

   Air bag indicator fails to light in the manner prescribed by the manufacturer, or continuously flashes, or if five sets of "beeps" are heard (concurrent with indicator failing to light.)

E. AIR BAGS (Continued)

2. Check Air Bag.

REJECT vehicle when:

Air bag has been deployed or is not present when OEM equipped.

F. FLOORBOARDS

1. Check the floorboard in both occupant compartment and trunk, for rusted-out areas or holes which could permit entry of exhaust gases, or which would not support occupants adequately.

REJECT vehicle when:

Floorboard (front and/or rear) is rusted through sufficiently to cause a hazard to an occupant, or so that exhaust gases could enter either the occupant compartment or trunk.

2. Check the space between the floor pan and frame for body lifts.

REJECT vehicle when:

Body has been lifted more than three (3) inches above OEM specifications. (See note on Page 30)

G. DOORS

Check door latches, hinges and handles for proper operation, fastening, and broken or missing components (try doors and locks).

REJECT vehicle when:

a) Doors or door parts are missing, broken or sagging so that the door cannot be tightly closed. (Rear inside door handles may be removed.)
b) Door latches do not function properly or have been removed.

NOTE: Shaved door handles with automatic releases are allowed provided that when the engine is running, and the vehicle is in drive, the wireless remote cannot activate door release switch.

H. HOOD

Check all vehicles for hood or engine cover. All vehicles must have a hood or engine cover.

1. Check hood and open to check safety catch for proper operation.

   REJECT vehicle when:

   a) Hood or engine cover is missing.
   b) Secondary or safety catch does not function properly.

2. Close hood and check for proper operation.

   REJECT vehicle when:

   Hood latch does not securely hold hood in its proper fully-closed position.

3. Manually check the hood latch or remote control for proper operation.

   REJECT vehicle when:

   Latch mechanism or its parts are broken, missing or badly adjusted so that the hood cannot be opened and closed properly.

4. Check for aftermarket hood scoop or air duct.

   REJECT vehicle when:

   a) Hood scoop is higher than 4 inches above the top of the hood.
   b) Moving parts are exposed above hood.

I. FRAME

Check the frame.

Repairs must meet OEM Specifications.

REJECT vehicle when:

a) Has any broken or cracked frame component.
b) Frame is rusted through.

J. MOTOR MOUNTS

Check all motor mount components.

REJECT vehicle when:

Motor mounts are broken or missing. Motor mount nuts or bolts are broken or missing.

K. EXTERIOR REARVIEW MIRRORS

1. From the driver's position, check exterior mirror(s) for a clear and reasonable unobstructed view to the rear.

   REJECT vehicle when:

   Is not equipped with required mirror. (One on driver's side on all vehicles, manufactured after January 1968, one on each side of vehicle when tinting is present and/or rear view is obstructed.

2. Check to see that mirrors are in the correct location and are mounted securely. Check for cracks, sharp edges or unnecessary protrusion.

   REJECT vehicle when:

   a) Mirrors are loose enough that rear vision could be impaired.
   b) Mirrors are cracked, pitted or clouded to the extent that rear vision is obscured.
   c) Mirrors will not maintain a set adjustment.
   d) Mirrors do not allow 200 feet of rear visibility.

L. INTERIOR REARVIEW MIRROR

From the driver's position, check interior mirror for proper mounting, location, cracks, sharp edges and ease of adjustment.

REJECT vehicle when:

a) Interior mirror is loosely mounted.
b) Interior mirror obstructs the drivers' forward vision.
c) Interior mirror does not provide a clear view of the highway at least 200 feet to rear.
d) Interior mirror is cracked, broken, has sharp edges or cannot be cleaned and rear vision is obscured.
e) Mirror will not maintain a set adjustment.

NOTE: All vehicles are required to have two rearview mirrors, one on the left side and an interior or right exterior mirror. When the side windows or rear windows are tinted or obscured, the vehicle must have a right and left outside mirror.

M. SPEEDOMETER/ODOMETER

Check vehicle to be sure that it is equipped with a properly functioning speedometer and odometer. (41-1a-901 UCA)

ADVISE vehicle when:

Speedometer or odometer is not functional or is disconnected.

SECTION 11 - EXHAUST SYSTEM

The exhaust system includes the exhaust manifold, catalytic converter, the header pipe or exhaust pipe, muffler and the tailpipe. Exhaust system must extend to the outside of the passenger section on vehicles under 10,000 GVWR.

EXHAUST SYSTEM

Check the manifold, exhaust or header pipe, mufflers, tail pipes and the supporting hardware.

REJECT vehicle when:

a) Muffler is missing.
b) Muffler has leaks of any kind on any part of the system. (Excluding drain holes installed by the manufacturer.)
c) Muffler elements of the system are not securely fastened.
d) Tail pipes do not extend beyond the outer periphery of the passenger compartment or are severely bent or broken.
e) Exhaust system passes through any occupant compartment.
f) Muffler cutout or similar device is installed.
g) Exhaust system is so constructed or located that an individual may be burned upon entering or leaving the vehicle.

NOTE: ***After Market Muffler Devices:***

(41-6-147 (b) UCA) Every motor vehicle shall at all times be equipped with a muffler or other effective noise suppression system in good working order and in constant operation. **Excessive or unusual noise is prohibited.**

SECTION 12 - FUEL SYSTEM

The fuel system includes the fuel tank, the fuel pump and the necessary piping to carry the fuel from the tank to the carburetor or injection system.

All motor fuel cells must be U.S. Department of Transportation (USDOT) approved.

FUEL SYSTEM

Check the fuel tank, the fuel tank support straps, the filler tube (rubber, plastic, or metal), the tube clamps, the fuel tank vent hoses or tubes, the filler housing drain, the overflow tube and the filler cap.

REJECT vehicle when:

a) Has any part of the system that is not securely fastened.
b) Has fuel leakage at any point in the system.
c) Fuel tank filler cap is missing.
d) Has physical damage to any fuel system component caused by aging.

NOTE: Check vehicles that have been altered to see that the fuel tank is not exposed. Unprotected fuel tanks must be protected by a skid plate or other device.

SECTION 13 – OFF ROAD VEHICLES AND "SAND" OR "DUNE" BUGGIES

Check vehicles that have been modified for off-road use for compliance with Safety Inspection Rules, Utah State Law, and Federal Motor Vehicle Safety Standards.

REJECT vehicle when:

a) Does not meet all inspection requirements for regular passenger vehicles.
b) Does not provide an enclosure or cockpit for driver and occupants.
c) Has Baja or T-bar style bumpers. (See Bumpers in Section 10 – Body)

Three wheel and four wheel off-highway vehicles, OHV, were not designed or constructed for highway use. OHV's do not meet Federal Motor Vehicle Safety Standards and may not be registered.

DO NOT INSPECT OHV'S.

GLOSSARY OF DEFINITIONS

The following word definitions are found in the Webster's H New Riverside University Dictionary.

ABSORB - To take in through or as if to soak in or up. *Absorbed - Absorbing Absorbs - Absorbability.*

ACCUMULATOR - An automobile storage component.

ACUTE - Extremely serious or significant.

ADAPTER - A device used to effect operative compatibility between different parts of one or more pieces of apparatus. *Adapter.*

ADEQUATE - Able to satisfy a requirement. *Adequacy - Adequateness - Adequately.*

ADJUSTMENT - To change so as to match or fit. To bring into proper relationship. *Adjust - Adjusted - Adjusting - Adjusts Adjustable.*

AFTER-MARKET -The demand for goods or services associated with the upkeep of a previous purchase.

AIR-BAG - An automotive safety device designed to inflate upon collision and prevent passengers from pitching forward.

ALTERED - To make different to modify. *Alter - Altering*.

ANCHORED - Something that provides a rigid point of support, stability, or security. *Anchor - Anchoring - Anchors.*

ANTI-LOCK - Computerized power surging system that keeps brakes from locking into a frozen position.

APPLIED - Put into practice or a particular use.

APPROPRIATE – Suitable; fitting.

ASPIRATED - To remove liquids or gases with an aspirator. *Aspirate - Aspirates Aspirating.*

ASSEMBLY - The combining of manufactured parts to make a completed product, esp. a machine.

AUTOMATIC - Acting or operating in a manner essentially independent of external influence or control. Self-regulating.

AUXILIARY - Giving or capable of giving assistance or support.

AXLE - A supporting shaft or member on which a wheel or pair of wheels revolves.

BALL BEARING - A friction-reducing bearing consisting of a ring shaped track containing freely revolving hard metal balls against which a rotating shaft or other part turns.

BASE - The lowest part of a structure as in foundation.

BEARING - A part supporting another machine part.

BENT - Not straight, crooked.

BINDING - To be tight and uncomfortable. To restrain.

BLOCKS - To support, strengthen, or retain in place by a block.

BODY - The passenger and cargo-carrying section of an aircraft, ship or vehicle.

BOLT - A fastener having a threaded pin or rod with a head at one end, designed to be inserted through holes in assembled parts and secured by mated nut that is tightened by application of torque.

BRAKE - A device for reducing or stopping motion, as of a vehicle, esp. by contact friction.

BRAKE DRUM - A metal cylinder to which pressure is applied by a braking mechanism so as to arrest rotation of the wheel or shaft to which the cylinder is attached.

BRAKE FLUID - Liquid used in a hydraulic brake system.

BRAKE LINING - The covering of a brake shoe or pad.

BRAKE PAD - A flat block brake lining that presses against the disc of a disc brake.

BRAKE SHOE - A curved block, attached to the brake lining, that presses against and reduces or stops the rotation of a wheel or shaft.

BROKEN - Forcibly fractured into pieces; shattered.

BULGES - A protruding part, as an outward curve or swelling.

BUMP - To cause to knock against an obstacle; displace.

BUMPER - Either of two metal structures, typically horizontal bars, attached to the front and rear of a car to absorb the impact of a collision, a protective device used to absorb shocks.

BUSHING(S) - A fixed or removable lining used to constrain, guide, or reduce friction.

CALIBRATE - To check, adjust or standardize systematically the graduations of a quantitative measuring instrument.

CALIPER - An instrument composed of two curved hinged legs, used for measuring internal and external dimensions.

CERTIFICATE - A document testifying to accuracy or truth.

CHAFED - To wear away by friction or irritation.

CHASSIS - The rectangular steel frame, supported on springs and attached to the axles, that holds the body and engine of an automotive vehicle.

CIRCUMFERENCE - The boundary line of a circle.

CLAMP - A device for joining, gripping, supporting or compressing structural or mechanical parts.

CLEAR(LY) - Free from what dims, obscures or darkens: Transparent.

CLOUDED - A dark blemish or spot, something that obscures.

COIL - A series of connecting spirals or connecting rings formed by winding or gathering.

COLLAPSE - An abrupt failure of function, strength.

COMPONENT - A constituent element, as of a system, a part of a mechanical or electrical complex.

COMPUTERIZED - Of or relating to a computer or the use of a computer.

CONTAMINATED - To make impure by mixture or contact.

CORRODE - To dissolve or eat away gradually by chemical reaction like rust.

CRACKS - To break without dividing into parts.

CRIMPS - To press or pinch into small regular ridges or folds.

CUSTOM - Specializing in the selling of made-to-order goods.

CUTS - To separate into parts with or as if with a sharp-edged instrument; sever.

CYLINDER - The chamber in which a piston of a reciprocating engine moves.

DAMPING - The capacity built into a mechanical or electrical device to prevent excessive correction and the resulting instability or oscillatory conditions.

DAMPEN - DAMPENING - To make slightly wet, moisten.

DAMAGE - Impairment of the usefulness or value of person or property.

DEFECTS, defective - A fault or imperfection: having a defect: faulty.

DEFROSTER - A heating device designed to remove ice or frost or prevent its formation.

DEPRESS - To push down.

DETERIORATED - To lower or impair in quality, or value.

DIAMETER - A straight segment passing through the center of a figure, esp. of a circle or sphere, and terminating at the periphery.

DISCONNECT - To interrupt or break the connection of or between.

DISCOLORED - To spoil or alter the proper color of stain; to become faded.

DISLOCATED - To displace from the proper or usual relation- ship with adjoining parts.

DISTORTION - To twist out of proper shape or relation; to contort.

DRAG - To cause to move with great reluctance, weariness, or difficulty.

ELECTRICAL - Of, relating to, or operated by electricity.

ELONGATED - To make or grow longer, extended, lengthened.

ENGINE - A machine that converts energy into mechanical motion.

ERRATIC - Lacking regularity, consistency, or uniformity.

ETCHING - To cut into the surface by the action of acid, printing designs or pictures.

EXCESS - An amount beyond the normal, sufficient, required or appropriate. Greater or more than the requirement.

EXPOSED - To remove protection from, the act of making visible.

EXTEND - To stretch or spread out to full length.

EXTERNAL - An exterior surface or part.

FAILURE - A cessation of proper functioning, a decline in strength or effectiveness.

GASKET - A seal or packing used between matched machine parts or around pipe joints to prevent the escape of a gas or fluid.

HEIGHT - The distance from the base to the top of an object.

HORIZONTAL - Parallel to or in the plane of the horizon.

HYDRAULIC - Of, involving, moved, or operated by a pressurized fluid, esp. water.

ILLEGAL - Forbidden by law, by official rules.

FENDERS - A metal guard over the wheel of an automotive vehicle.

FLEXIBLE - Capable of being bent or flexed; pliable.

FLUSH - To be cleaned by a rapid brief gush of water.

FMCSA – Federal Motor Carrier Safety Administration

FMVSS - Federal Motor Vehicle Safety Standard

FORCE - To compel through pressure or necessity; to move against resistance.

FRAME - A skeletal structure designed to shape and support.

FRAYED - To wear away by rubbing, a frayed spot as on fabric.

FRICTION - The rubbing of one object or surface against another.

FROZEN - Rendered immobile.

FUNCTIONAL - Designed for or adapted to a specific function or use. To have or perform a function.

INDICATOR - An instrument as a meter or a gauge for monitoring the operation or condition of a physical system, as an engine.

INOPERATIVE- Not working or functioning.

INSTABILITY - Lack of stability.

JAGGED - Having sharp or ragged projections on a surface or edge.

JAMMING - To activate or apply suddenly, as automotive brakes. To cause to lock in inoperable position.

JOINT (S) - A point or a position at which two or more things are joined. A configuration in or by which two or more things are joined.

KINKED - A tight curl or sharp twist in a wire-like material, typically caused by the tensing of a looped section.

KNOT, knots - A compact intersection or interlaced material, as cord, ribbon, or rope. To tie in or become entangled.

Laminated – Made up of bonded layers.

LAMP - A device that generates, heat, light, or therapeutic radiation.

LATCH, latching - To close or lock with or as if to latch.

LEAF SPRING - A composite spring used especially in automotive suspensions, consisting of several layers of metallic strips joined to function as a unit.

LEAK, leakage - To allow the passage or escape of something through a breach or flaw. A crack or opening that permits something to escape from or enter a container or conduit.

LENS - A carefully ground or molded piece of glass, plastic, or other transparent material with opposite surfaces either or both of which are curved by means of which light rays are refracted so that they converge or diverge to form an image.

LEVERAGE - The action of a lever. The mechanical advantage of a lever.

LINKAGE - A system of interconnected machine parts, as rods, springs, and pivots, for transmitting power or motion.

LOOSE - looseness - Not tight fitting, not bound, stapled, bundled or gathered together.

MALADJUSTMENT - Faulty adjustment as in a machine.

MECHANISM - Mechanical device, and arrangement of machine parts.

METALLIC - Of, relating to or having the characteristics of a metal.

MINIMUM - The least possible quantity or degree. The lowest amount or degree reached.

MIRRORED - A surface able to reflect enough undiffused light to form a virtual image of an object placed before it.

MISPLACED - To put in wrong place.

MODIFIED - To change in form or alter. To make less extreme, severe or strong.

MOVEMENT- A mechanism that produces or transmits motion.

MUFFLER - A device that absorbs esp. one used with an internal combustion engine.

OBSCURED - Deficient in light, dark. Lacking a clear delineation, indistinct.

OEM - Original Equipment Manufacturer.

PATCH - To mend, repair, or put together, esp. hastily or shoddily.

PAWL - A hinged or pivoted device adapted to fit into a notch of a ratchet wheel to impart forward motion or prevent backward motion.

PERIPHERY - The outermost region or part within a precise boundary.

PIT, pitted - A natural depression or small indentation on a surface. To make cavities, depressions or scars.

PLEXIGLAS - A trademark for a light, transparent, weather-resistant thermoplastic.

PRESSURE - An application of continuous force by one body on another that it touches.

PROTRUDE - To push or thrust outward, to jut out.

PUMP, pumping - A device or machine for transferring a gas or liquid from a source or container through tubes or pipes to another container or receiver. To cause to operate with the up and down motion of a pump handle.

RATCHET - A mechanism consisting of a pawl that engages the sloping teeth of a bar, or wheel, of a ratchet.

RATING - To specify performance limits.

REFLECT - To throw or bend back light

SEAL/SEALED - An adhesive agent used to close or secure something or prevent seepage of moisture or air.

SECURE, secured - Not likely to fail or give way, stable, well-fastened.

SEEP, seepage - to pass slowly through small openings or pores. Something that has seeped.

SEIZE, seizing - To fuse or cohere with another part due to high pressure or temperature, slowing or stopping further motion.

RESERVOIR -A receptacle for storing a fluid.

RESTRICT, restricted - To hold within limits, to confine.

RIM - The circular outer part of a wheel , furthest from the axle. A circular metal structure around which a wheel tire is fitted.

RIVET - A metal bolt or pin having a head on one end, used to fasten metal plates or other objects together by inserting the shank through a hole in each piece and hammering down the plain end so as to form a new head.

ROTOR - A rotating part of an electrical or mechanical part.

RUB/rubbing - To subject to the action of something that moves back and forth with friction and pressure.

SAGGING - To lose strength, firmness, or resilience.

SCRATCH, scratched - To make a narrow line or mark with a sharp instrument. To scrape or strike on an abrasive surface.

SEVERE - Corresponding strictly and rigidly to established rule.

SEVERED - To become cut or broken apart.

SHACKLE - A device used to fasten or couple. (Shackles, something that restrains or confines.)

SHADE, shaded - Light reduced in intensity due to interception of the rays; partial darkness. To obscure or to darken.

SHATTER, shattered - To cause to break or burst suddenly into pieces. A fragmented or splintered condition.

SHIMMY - Abnormal vibration, as in the chassis of a motor vehicle.

SLIP, slippage - To move quietly and smoothly, glide. To cause to move in a smooth easy or sliding motion.

SMEAR - To stain by or as if by spreading or daubing with a sticky, greasy or dirty substance.

SNAG - A sharp rugged, or jagged protuberance.

SPECIFICATIONS - An exact written description of an item.

SPRINGS - An elastic device, as coil or wire that regains its original shape after removal of stress.

STABILITY - Resistance to sudden change, dislodgement, or overthrow. *Reliability, dependability.*

STEEPING - To direct the course, to maneuver, to guide a vessel or vehicle.

STRUT - To brace with a supporting bar or rod.

SUSPENSION - The system of springs that protects the chassis of a motor vehicle from shocks transmitted through the wheels.

SWITCH - A device for breaking or opening an electrical circuit or for diverting current from one conductor to another.

SYSTEM - A group of interacting mechanical or electrical components.

TENSION - A force tending to stretch or elongate something, the measure of such force.

TILT - To cause to slope as by raising one end.

TINT, tinting - A shade of a color, a slight coloration, a shaded effect. To give a tint or take on a tint.

TORSION BAR - A part of an automotive suspension consisting of a bar that twists to maintain stability

TRACK - To keep a constant distance apart; Used as a pair of wheels. To be in alignment.

TRANSMISSION - An automotive assembly of gears and associated parts by which power is transmitted from the engine to a drive shaft.

TRAVEL - To move from one place to another.

TREAD - The grooved face of a tire.

U-BOLT - A bolt shaped like the letter "U", fitted with threads and a nut at each end.

UNLADEN - Without load.

USDOT - United States Department of Transportation.

VACUUM - A state of being sealed off from external or environmental influences.

VALVES - A device that regulates the flow of gases, fluids or loose materials through a pipe, the moveable control element.

VERTICAL - Being at right angles to the horizon.

VISUAL - Capable of being seen by the eye.

WEEPING - To ooze, exude, or let fall drops of liquid. Drops of moisture.

WEIGHT - A measure of the heaviness or mass of an object.

WELDED - To join metals by applying heat, sometimes with pressure and sometimes with an intermediate or filler metal having a high melting point.

WIDTH - The measurement of the extent of something from side to side.

WORN - Affected by use or wear, impaired, damaged, or showing fatigue by use or wear.

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